IDRC-141e

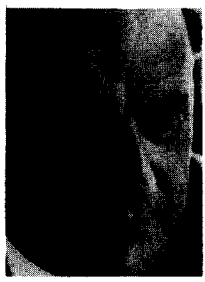
Canada's Role in Science and Technology for Development

Proceedings of a symposium held at the Ontario Science Centre, Toronto, Canada 10–13 May 1979

J. King Gordon
Editor

Contents

Role of the International Scientific Community



Alexander King, IFIAS

The assumption that Jorge Sabato mentioned last night, that the great accumulation of science and technology in the North and the rest of the industrialized world should be speedily and rather easily transferred to the South, dominated the first two decades of development of the United Nations, and with a good deal of disappointment. Not that progress was absent: large numbers of countries increased greatly their prosperity, their material strength, their level of health, etc. But the results were patchy, and the obstacles and the gap between the rich and the poor still exist. Furthermore, in many cases many of the advantages were absorbed by population increases or were siphoned back from the poor to the rich in the form of arms purchases. The problems that remained, which were often the result of economic growth in developing countries, meant essentially an expansion of the small numbers of the rather prosperous elite, with their Westernized appetites; the masses of the poor were untouched.

During these two decades science and technology did play a part — and, in the case of technology, quite a big part. But science, from the beginning, was rather a stepchild. In the national aid agencies, for example, it was often regarded essentially as a problem-solving device to be brought in when required, rather than as an agent of progress and development, to be cultivated systematically and rationally. Canada is an exception because IDRC, being separate from the Canadian International Development Agency (CIDA), is a pioneer organization and one that is being emulated in other countries. But, in general, in most countries the scientists attached to the aid programs were outside of both the government and the scientific community, and there was little relationship between science within aid and the national science policy of the country. Some of the national science bodies were actually resentful of the siphoning off of money for research for the Third World as something that threatened their situation.

This is really not too surprising because, until very recently, governments and even industrialists in the developed countries understood very little about the complex socioeconomic factors related to internal technological innovation, and the scientists, in their extreme naïveté, were always assuming that once a discovery was made it would be automatically applied. We know very well that this is not true. But much has been learned, as Jorge said, on the academic front in the last few years in most countries, and it is possible, I think, to make a new start, with greater understanding.

Apart from the assumption of the value of using existing scientific and technological knowledge, there have been assumptions that are much more questionable, are seldom expressed, and are implicitly opposed, although they seem to have been applied generally throughout the development decades.

First is the assumption that the materialistic Western approach to the development of a country and a society is the only method appropriate for all countries, whatever their culture. This, I think, is much more questionable today: one has the example of Iran and other nations. Many Third World countries are questioning the methods and the objectives of development in the crudest Northern sense but at the same time are doing their best to emulate the North.

The second assumption is that the benefits of development trickle down from the rich to the poor and do so sufficiently quickly to be of value. I remember a discussion in Tehran just a year ago. One very bright Iranian economist was talking about this trickling down, and he said: "It has taken 100 years, perhaps 200 years, for the advanced countries, starting with the industrial revolution, to do this; we shall accomplish it in 20 years." Unfortunately, he hasn't had the 20 years to do it in. So the trickle-down theory is again something that is important but is to be questioned.

The third assumption is that the technologies developed for rich, consumption-oriented societies are automatically, appropriately, and socially easily transferred to other societies at different levels, with different cultures and different objectives. This is not a black and white situation but deserves much greater study than it has had in the past.

As individuals, scientists have been strongly involved since the beginning in international aid programs. Large numbers of experts, through the various aid agencies, through bilateral arrangements, and through the United Nations, have traveled and worked in the developed countries, particularly in agriculture and medicine — agriculture understandably, because it is so basic in so many countries, particularly those facing great and rapid increases in population. I remember very well that when we were examining the science policy of Ireland the stress was laid on agriculture, and the Irish in their typical way said: "Well after all, farmers are the real experts, because what is the definition of a farmer? A man out standing in his field." So the number of agricultural experts that have been involved is large. Similarly with medicine and many technological matters, but here the involvement has been sporadic and not very systematic.

A number of the national scientific organizations have paid a great deal of attention to the initiative of Patrick Blackett, and have had organized discussions and conferences on the subject. The National Academy of Sciences in Washington has an extremely honourable record of successful activities in many countries, particularly in Latin America, where its sympathetic scientific aid has been easily assimilated and has been very useful. But these are exceptions. The 1963 conference of the United Nations in Geneva was to some extent a conference in which the scientific community dominated, though not very successfully. It was, in fact, mainly a *dialogue des sourds*, in which scientists read papers — very abstract papers in some cases, very practical in others — before an audience of diplomats from the Third World — nonscientific, of course. So that conference wasn't as effective as it might have been, and I am therefore glad that something different is planned for the Vienna conference.

In the international field the International Council of Scientific Unions has cohosted scientific meetings and has instigated a number of studies involving scientists from the Free World. A recent development, which again was touched

upon by Jorge last night, the arising of recognition of the importance of the global problems, will have, I think, big repercussions on the future cooperation and intervention of scientists throughout the world in these problems.

Some of us in this room were, not many months ago, at a meeting at Tallin, in the Soviet Union, where the Russians were making a strong point of the need to start a new wave of scientific and technological cooperation because of the impossibility for individual countries, no matter how strong, to tackle many of the global problems, such as carbon dioxide warming up the atmosphere, other environmental matters, and the use of the oceans. These problems were not merely dismissed on ideological grounds but were regarded by the Soviet academicians as subjects that demanded complete attention. But the point is, of course, that science and technology for development in the broad sense is one of the big global problems. Furthermore, nearly all the big global problems have particular repercussions on the Third World countries.

My own organization, the International Federation of Institutes for Advanced Study, has the job of promoting and sometimes carrying out transdisciplinary projects related to long-term world problems. We are finding that all our work is becoming oriented toward the problems of the Third World. For example, work we have done on the loss throughout the world of productive soil from many causes, artificial and natural, has particular relevance to many Third World countries. And the new promises of enzyme science, of biotechnology, although potentially important to the North, are of great importance to countries with large rural populations in the tropics, with the advantages of good radiation, quick photosynthesis and so on. Problems of water management and of climatic change, all the things we are concerned with in IFIAS, involve the Third World in a primary sense.

We are also working with the scientific community, because we have no government money, on specific matters. For example, Tony Zahlan raised the question of science in the Arab countries. We have a project just starting on science and Islam in which there will be an examination from the two sides jointly, our friends in the Arab world and scientists from the North, of the technologies appropriate and assimilable in the Islamic cultures, religious and social. We have also brought together, and this is an initiative of the scientific community through IFIAS, people from the multinational corporations and scientists, sometimes rather querulous, from the Third World to discuss the long-term place of industry in development and to establish, as far as possible, joint objectives, points of common self-interest, and points of divergent interest to create a better atmosphere. This is proving to be an interesting experience.

In spite of the various activities in which scientists have been involved, there has been a good deal of frustration among individuals, mainly from the Northern countries, who feel that their science has potentials that are not understood and not used for the development of other countries. There is a feeling of frustration that they don't seem to have any impact on the policymaking in relation to all this. In the Third World countries some scientists feel that they are being pushed off into academic units as expatriates from the world of science, which is mainly in the North, where they work under difficult circumstances and are not able to come to grips with the national problems.

Hence, in general, I think the scientific world, particularly at the outset, was very favourable to the idea of a United Nations conference that might do two things: expose the problems more clearly, showing their interconnections, and create some sort of bridge between the scientists and the body politic. It is very important that this be attempted. And possibly, as Guy Gresford said last night,

the preparations and the subsidiary activities that have taken place justify the whole exercise.

Many scientists have been consulted about the creation of national papers analyzing the problems encountered in applying science and technology in their countries. Others have felt great frustration because they have been consulted but their ideas have not been taken seriously and have not always appeared in the national papers.

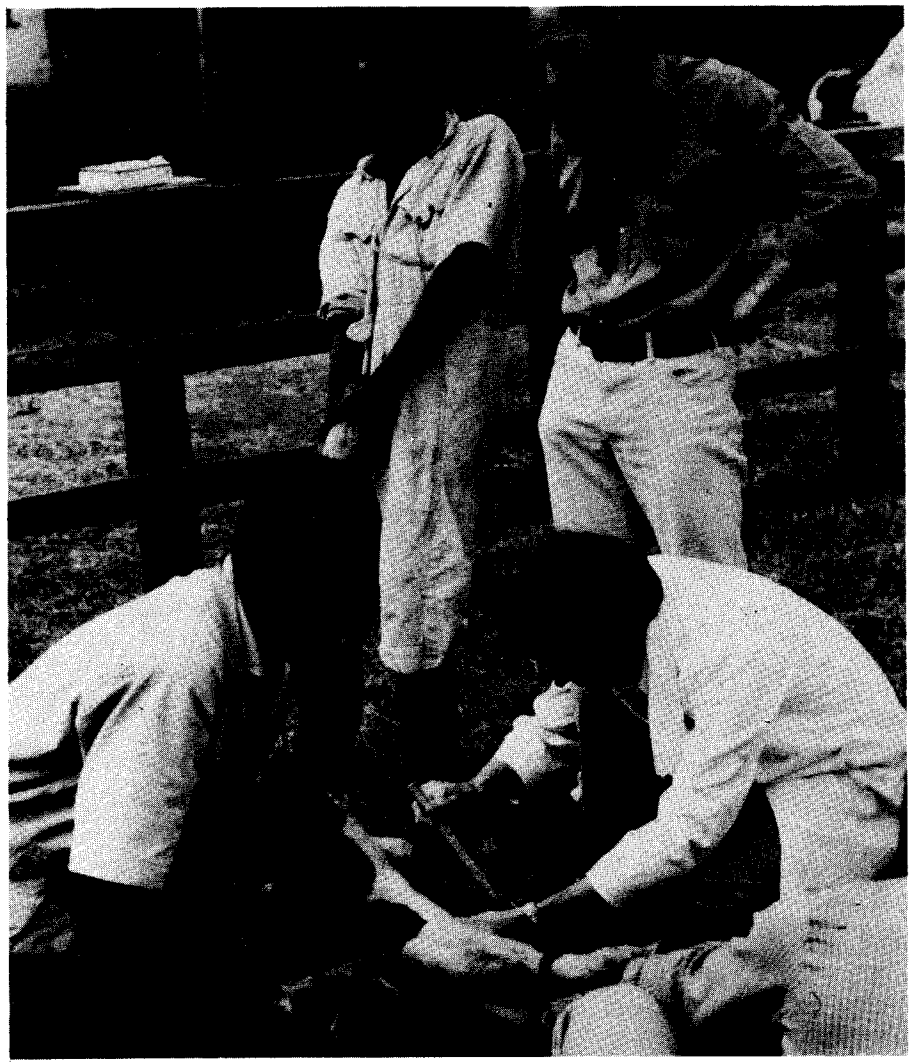
About a year and a half ago, a number of us, concerned with these problems from the point of view of science, felt that it would be useful for the scientific community to involve itself in a complementary way in the activities that would culminate in the Vienna conference. We were, quite frankly, a bit afraid of the conference's being a purely governmental activity, at which the problems of the transfer of technology, the wickedness of the multinational corporations, etc., being politically so fashionable, might be discussed to the exclusion of science. And we heard yesterday that scientists, to some extent, were being left out; after all, the conference is an official intergovernmental activity. So we thought that it was important to bring together representatives of the scientific community for two purposes: to analyze many of the problems in more depth than would be possible at a purely formal and essentially political intergovernmental meeting and to demonstrate the concern of scientists all over the world about these problems, with a view to future and more permanent cooperation.

So, ICSU called an informal ad hoc meeting, and this resulted in a symposium for scientists on science and technology for development, which took place in Singapore at the end of January of this year. This meeting was historic in that 19 of the international nongovernmental organizations gave moral support to this meeting; generous financial support came from both IDRC and CIDA, and from UNESCO and aid agencies in the United States. This conference, being supported by scientific bodies representing the natural, medical, engineering, social, and other sciences, was probably the first occasion on which the scientific community acted together on anything.

Probably the main point emphasized at this meeting was the need to build up the infrastructure in each country to enable technology and science from outside to be selected well, to be assimilated, to take root, and to flourish and extend. It was clear that the mere transfer of technology is not the end, but the beginning of the problem, and the social and other obstacles are extremely relevant; a mere infrastructure is insufficient. But there is the need to integrate and to articulate the scientific and the technological competence, which could only be acquired very gradually, with the educational, and political systems. This is a very complicated and difficult task, which is still not completely achieved, even in countries such as Canada.

The meeting was an outstanding success. There were no major confrontations between North and South; there were many differences of opinion, but it was clear that the objectives were common. A resounding call was heard for continuing support by the scientists of the world in these problems, and arrangements are being made for follow-up activities.

A particularly interesting aspect was the reaction of the UNESCO representative to the situation: he offered to modify the approach of his organization by involving the independent scientists in the planning as well as the implementation of development policies, and he looked forward to a greater and more systematic involvement of science in this area. In discussions in Paris in the last 2 weeks, it has been made clear that UNESCO intends to take this seriously. As far as the scientific community is concerned, our continuing organization, what-



The future is the main focus of veterinary scientists from Nairobi, Kenya, and Guelph, Canada, who are cooperating in studies of cattle diseases. Working with others, M.G. Maxie, Ontario Veterinary College, extracts bone marrow from a calf.

ever that may be, is by no means settled, and discussions on that will be taking place in a month or so.

Just one last point: The fourth agenda item — the forgotten item, the avoided item — of the United Nations conference, science in the future, is important. Science, after all, is by its very nature forward-looking. It is probing into the dark, and its discoveries, even as mere ideas, are the seeds of the future, so we think. But they can only be the seeds of the future if they are nurtured in a soil that contains the appropriate nutrients. Apart from the direct help of science in solving today's problems of development, it is tremendously important that the future orientation of science as the parent of technology, as the grandparent of the economy, be inserted somewhere in the permanent machinery. Let us

take one example: the microelectronics revolution, the microprocesses, and so on, that are already envisaged. Their impact is under discussion in all advanced countries, and they pose considerable threats to the building of the economies of many of the Third World countries. As with artificial leather and ersatz coffee, it is to the disadvantage of the developing countries that the developed countries, the industrialized countries, bring forward ideas and developments that will, in fact, lessen the chances of the others. But, it seems to me inevitable that with the scarcities and high costs of energy and materials, despite the problems of employment, the industrialized countries will be forced to use their skills through this second wave of scientific revolution. And it is very important that this and many other things be discussed and understood now by the Third World as well as the industrialized world. Therefore, science and the future, to my mind, is purely a practical and tremendously important matter, and should not be lost from our agenda.

Alexander King is Chairman of the International Federation of Institutes for Advanced Study, former Director-General for Scientific Affairs and Education of OECD, and cofounder of the Club of Rome.